

PRAMESH SUNDER SHRESTHA¹
BIPIN KARKI¹
SUBHASH ACHARYA²
NINADINI SHRESTHA²

Department of Critical Care Medicine
Om Hospital and Research Center
Kathmandu, Nepal¹

Department of Anaesthesiology
TU Teaching Hospital, IOM
Maharajgunj Medical Campus
Kathmandu, Nepal²

Corresponding Author
Dr. Ninadini Shrestha

Department of Anaesthesiology
TU Teaching Hospital, IOM
Kathmandu, Nepal

Email: ninadinishrestha@hotmail.com

AN UNUSUAL CASE OF DIFFICULT EXTUBATION

ABSTRACT

We report a case of difficult extubation in a child due to failure of cuff deflation. Various reports have been mentioned in literature about difficulty in removal of the endotracheal tube due to errors like malfunctioning of the pilot balloon or kinking of the tubing of the pilot balloon, very large cuff impinging on the vocal cords, adhesion of tracheal tube to the tracheal wall due to transfixation by suture or metallic wire. The objective of this case report is to highlight the importance of rare but life threatening complications that can occur in case of failure of cuff deflation .

Keywords: Difficult, Endotracheal tube, Extubation, Pilot balloon

INTRODUCTION

The paediatric airway has been described to be different from the adult airway in that the shape of the airway is conical rather than being cylindrical with the cricoid ring being the narrowest portion of the airway.¹ Children hence have a smaller and fragile airway than adults. We report a case of a five-year-old child who was intubated in the emergency for head injury with an empirically appropriately sized cuffed endotracheal tube in whom we faced difficulty in extubation for unknown reasons. The choice of cuffed endotracheal tube was based on need of mechanical ventilation and avoidance of aspiration due to poor Glasgow Coma Scale (GCS) level. However, many controversies still remain about the appropriate size of cuffed vs uncuffed endotracheal tube in children.

CASE REPORT

A five-year-old male child presented in the emergency room with the history of loss of consciousness and abnormal body movements suggestive of generalized tonic-clonic seizures following a fall from a one storey building. The child was intubated in the emergency room for poor GCS with a 5mm internal diameter Murphy's eyed cuffed endotracheal tube in a single attempt with a Cormack Lehane Grade-I without any resistance or undue use of force. CT-

scan of the head was obtained and the patient was then transferred to our intensive care unit for further management. The patient was managed in the line of traumatic brain injury with early post traumatic seizure. All his investigations were normal except for the CT-scan head suggestive of Diffuse Axonal Injury. The patient regained consciousness the next morning with a GCS of E4M6VT and was planned for extubation. The patient's family was counseled and in a propped up position, the pilot balloon was deflated and extubation was attempted. However resistance was felt and the tube failed to come out from trachea. The first impression was the incomplete deflation of the pilot balloon. Thus we tried to further deflate the pilot balloon and a couple of more attempts were made at extubation without success. Further inspection was done in the tubing of the pilot balloon for any kinks especially around the fixing tape which was completely removed. No such findings were made.

After a few more attempts, the patient was sedated and direct laryngoscopy was done. The cuff could not be visualized. Next, the pilot balloon was cut, aspiration of the air was done with a syringe and another attempt was made under vision but to no success.

The family was explained and the planned extubation was deferred for later and intravenous dexamethasone was started in suspicion of

vocal cord edema. Consultations were made with anaesthesiologists, ENT surgeons and the paediatricians. After few hours, a flexible nasopharyngolaryngoscope was used to visualize the cuff from inside the endotracheal tube which was still inflated. With the help of direct laryngoscope further visualization was possible via nasopharyngolaryngoscope. A Quincke's spinal needle was then used under guidance with the fiberoptic scope to make a puncture on the small bit of cuff visualized. Yet the patient was unable to be extubated. The bulb was punctured percutaneously with a needle but to no success. After a second laryngoscopy and a few rotatory movements, some more of the cuff was visualized and another puncture was made at a different point. Following this, the tube was successfully removed. However in view of the repeated manipulation of the airway, the patient was reintubated with a 4mm ID uncuffed ET tube which was removed the next morning with continued steroid therapy. The patient was shifted to the ward after 24 hours and then discharged after two days.

DISCUSSION

The paediatric airway has been described as being different from the adult airway in many aspects. One of the most important differences being that the paediatric airway has a slanting glottis and a conical shaped larynx with the narrowest portion being at the level of the cricoid which makes assessment of the appropriate sized tube difficult.² Various studies have shown the use of the cuffed and uncuffed tubes in the paediatric airway as indicated with numerous advantages enumerated. A recent Cochrane review has also pointed out similar advantages.³

Predicting the appropriate size of the tubes to be used in the paediatric airway is also known to be challenging. Various empirical formulae have been devised with various accuracies.⁴ The child was also intubated with a supposedly appropriately sized endotracheal tube based on this with no apparent difficulty during intubation. The difficulty with extubation was unanticipated. The most common difficulty have been reported to be due to failure of the cuff to be deflated due to fixation of the pilot balloon sideport by the fixing tape or the technical failure of the one way valve in the pilot balloon. This was excluded by complete removal of the fixing tape and even cutting off of

the pilot balloon. Another technique described is puncturing of the cuff using a long needle either percutaneously or via direct laryngoscopy.⁵ Both of these techniques were used in our case. After extubation, upon examination of the endotracheal tube we confirmed the problem with deflation of the tube (Figure I). There were two punctures in the cuff, (Figure II) confirmed with re-inflation of the cuff with Methylene Blue.

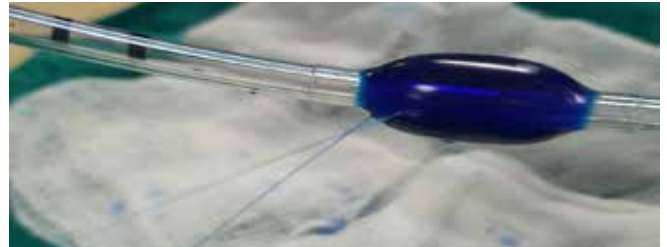


Fig I: Checking the puncture site of the cuff with methylene blue



Fig II: Cuff showing two puncture sites.

Though rare, encountering tracheal cuff deflation problem causing difficult or failed extubation is reported in literature. Being aware of such problems will help us avoid complications in the airway.

REFERENCES

1. Harless J, Ramaiah R, Bhananker SM. Symposium : Critical Airway Management Pediatric airway management. 2014;4(1):65–70.
2. Klucka J et al. Controversies in Pediatric Perioperative Airways. BioMed Research International.2015,Article ID 368761,11 pages
3. Fa DO, Rgac A, Lemos A, Psgn B, Jn F, Pg K, et al. Cuffed versus uncuffed endotracheal tubes for general anaesthesia in children aged eight years and under (Review). cochrane library.2017;(11).
4. Writer H, Doherty D. A weight-based formula for tracheal tube size in children.pediatric anesthesia. 2009;343–8.
5. Borkar S, Desai RA. A Case of Difficult Extubation. Indian Journal of Anaesthesia. 2008;52(1):83–4.